The antibiotic resistance of microorganisms has become a global problem so medicine waits for new efficient antimicrobial drugs, which would be effective against multiple antibiotic-resistant pathogenic bacteria. This has become the major problem of medical microbiology and public health. However, development of new antibiotics costs on average between 2 and 3 billion US dollars, and the duration of new antibiotic development and medical trials exceeds 10 years. This is too high costs for even large pharmaceutical companies and many of them have stopped development of new antibiotics.The most recently developed antibiotic teixobactin was discovered nearly 30 years ago and no new class has been found since 1987. The previous newest antibiotic, linezolid, was implemented into clinical practice and approved by FDA nearly 20 years ago.

Yeasts, the unicellular fungi, do not produce antibiotics, however, possess many advantages to be used in biotechnology like simple nutritional requirements, fast growth, phage resistance, and often GRAS status. Antibiotic roseoflavin (RoF) is the natural analog of riboflavin (vitamin B2) and produced by the soil actimomycetes *Streptomyces davaonensis* and *Streptomyces cinnabarinus*. Roseoflavin effectively suppresses the growth of Gram-positive pathogenic bacteria like *Staphylococcus aureus* and *Listeria monocytogenes*, and its chemical derivatives show anticancer activities. The biosynthetic precursor of roseoflavin, aminoriboflavin, also shows antibacterial activity being non-toxic to the mammal cells. The mentioned bacterial producers accumulate small amounts of roseoflavin whereas aminoriboflavin is not accumulated at all. It is known that roseoflavin is synthesized from riboflavin coenzyme, flavin mononucleotide (FMN).

Construction of recombinant yeast strains producing roseoflavin and aminoriboflavin could open quite new perspectives for production of bacterial antibiotics in technologically well-suited yeast cells.

The main objective of this project proposal is to construct producers of bacterial antibiotics roseoflavin and aminoriboflavin in the flavinogenic yeasts *Candida famata* and *Komagataella phaffii* to determine the properties of the yeast producers of heterologous enzymes and antibiotics: kinetics of growth and antibiotic synthesis, mechanism of the antibiotic excretion from the producing cells and the mechanisms of toxicity to the yeast producers, the targeted bacteria and mammalian cells.

As result, the yeast producers of bacterial antibiotics will be constructed for the first time.